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SOLAR/1018-79/01

Monthly Performance Report

STEWART-TEELE-MITCHELL

JANUARY 1979

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

4241

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MONTHLY PERFORMANCE REPORT

STEWART-TEELE-MITCHELL

JANUARY 1979

I. SYSTEM DESCRIPTION

The Stewart-Teele-Mitchell site is a single-family residence in Malta, New York. The home has approximately 1900 square feet of conditioned space. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system has an array of flat-plate collectors with a gross area of 432 square feet. The array faces south at an angle of 45 degrees to the horizontal. A glycol/water solution is the transfer medium that delivers solar energy from the collector array to a heat exchanger. Water is then used as the transfer medium that delivers solar energy from the heat exchanger to storage, and to the space heating and DHW loads. Solar energy is stored in the basement in a 1000-gallon insulated tank. Preheated city water is stored in a 75-gallon preheat tank and supplied, on demand, to a conventional 40-gallon DHW tank. When solar energy is insufficient to satisfy the space heating load, an oil-fired furnace provides auxiliary energy for space heating. Similarly, an electrical heating element in the DHW tank provides auxiliary energy for water heating. The system, shown schematically in Figure 1, has five modes of solar operation.

Mode 1 - Collector-to-Storage: This mode activates when the collector temperature exceeds the storage temperature by 20°F and terminates when a temperature difference of 3°F is reached. Solar energy is transferred through the heat exchanger that transmits energy from the solar collection loop to the storage loop. Collector loop pump P1 and storage loop pump P2 are operating.

Mode 2 - Collector-to-Space Heating: This mode activates when mode 1 conditions are satisfied and there is a demand for space heating. The collected solar energy bypasses storage and flows directly to the solar heating coil in the air-handling system. Mode diversion valve V2 is open.

Mode 3 - Storage-to-Space Heating: This mode activates when there is a demand for space heating, the temperature at the top of the storage tank exceeds 100°F, and solar energy from the collector is not available. Pump P3 is operating.

Mode 4 - Storage-to-DHW Tank: This mode activates when the temperature at the top of the storage tank exceeds the preheat tank water temperature by 10°F. Pump P4 is operating.

Mode 5 - Summer Mode, Collector-to-Vent: This mode activates when the collector array output fluid temperature exceeds 220°F. The collected solar energy is rejected through a fintube heat exchanger located outside the dwelling. Valve V1 directs the collector loop flow through a purge unit.

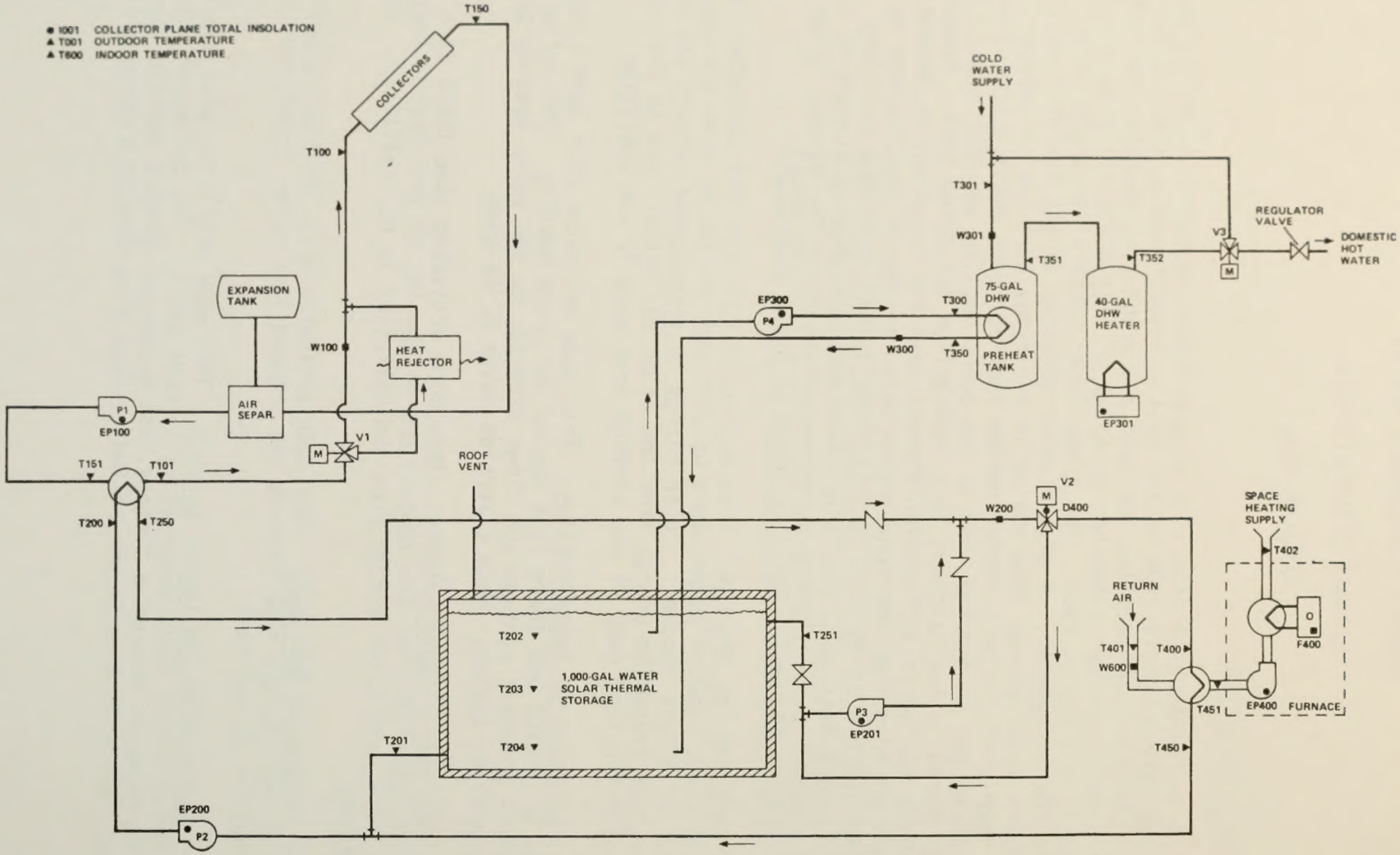

Figure 1. STEWART–TEELE–MITCHELL SOLAR ENERGY SYSTEM SCHEMATIC

II. PERFORMANCE EVALUATION

INTRODUCTION

The solar energy system operated continuously during January. The average daily insolation was approximately 56 percent of the long-term January average for the area. The average daily temperature closely approached the long-term average. The house was occupied in January and the DHW preheat subsystem which had not operated previously was activated. Solar energy satisfied a very small portion of the space heating and DHW loads during the month.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 6.1 million Btu for a daily average of 454 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during January of 818 Btu per square foot for a south-facing plane with a tilt of 45 degrees to the horizontal. The average ambient temperature during January was 21°F as compared with the long-term average for January of 22°F. The number of heating degree-days for the month (based on a 65°F reference) was 1361, as compared with the long-term average of 1349.

THERMAL PERFORMANCE

System - During January the solar energy system performed approximately the same as expected. The expected performance was determined from a modified f-chart analysis using measured weather and subsystem loads as inputs. Solar energy collected was 0.63 million Btu versus an estimated 0.65 million Btu. Solar energy used by the system was estimated by assuming that all energy collected would be applied to the load. Actual solar energy used was 0.33 million Btu. System total solar fraction was 1 percent versus an estimated 6 percent.

Collector - The total incident solar radiation on the collector array for the month of January was 6.1 million Btu. During the period the collector loop was operating, the total insolation amounted to 2.4 million Btu. The total collected solar energy for the month of January was 0.63 million Btu, resulting in a collector array efficiency of 10 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 0.58 million Btu, while solar energy delivered from the collector array directly to the loads amounted to 0.024 million Btu. Energy loss during transfer from the collector array to storage and loads was 0.030 million Btu. This loss represented 5 percent of the energy collected. Operating energy required by the collector loop was 0.037 million Btu.

Storage - Solar energy delivered to storage was 0.58 million Btu. There were 0.33 million Btu delivered from storage to the DHW and space heating subsystems. Energy loss from storage was 0.38 million Btu. This loss represented 65 percent of the energy delivered to storage. The storage efficiency was 35 percent: This is calculated as the ratio of the sum of the energy removed

from storage and the change in stored energy, to the energy delivered to storage. The average storage temperature for the month was 78°F.

DHW Load - The DHW subsystem consumed 0.20 million Btu of solar energy and 0.60 million Btu of auxiliary electrical energy to satisfy a hot water load of 0.59 million Btu. The solar fraction of this load was 9 percent. Losses from the DHW solar subsystem were 0.21 million Btu. The DHW subsystem consumed a total of 0.081 million Btu of operating energy, resulting in an electrical energy expense of 0.018 million Btu. A daily average of 31 gallons of DHW was consumed at an average temperature of 118°F delivered from the tank.

Space Heating Load - The space heating subsystem consumed 0.13 million Btu of solar energy and 16.2 million Btu of auxiliary thermal energy (equivalent to 23.2 million Btu of auxiliary fossil fuel energy) to satisfy a space heating load of 16.4 million Btu. The solar fraction of this load was 1 percent. The space heating subsystem consumed a total of 0.62 million Btu of operating energy, resulting in an electrical energy expense of 0.006 million Btu.

OBSERVATIONS

Although a substantial amount of solar energy was applied to preheating DHW, the operating energy requirment of the solar DHW preheat subsystem exceeded the added energy in the water entering the gas-fired auxiliary DHW tank from the preheat tank. As measured across the solar heat exchanger in the DHW preheat tank, 0.20 million Btu of solar energy were used in preheating incoming city water. As measured by the temperature differential of the water entering and leaving the DHW preheat tank, energy added to the DHW was only 0.07 million Btu. Energy required to operate the storage/DHW loop pump was 0.08 million Btu, resulting in a net loss of 0.01 million Btu of electrical energy in the DHW preheating process during the month of January.

ENERGY SAVINGS

The solar energy system provided a fossil fuel energy savings of 0.22 million Btu at an expense of 0.062 million Btu of electrical energy. The DHW subsystem provided no electrical energy savings at an expense of 0.018 million Btu. The space heating subsystem contributed a fossil fuel energy savings of 0.22 million Btu at an expense of 0.006 million Btu of electrical energy.

III. ACTION STATUS

Minor sensor problems existing in the energy collection and storage subsystems will be addressed by Boeing during the next scheduled site visit. IBM has recommended to Boeing that an additional flowmeter be added to the instrumentation and that currently installed flowmeter W200 be relocated.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY,1979

SOLAR/1018-79/01

SITE/SYSTEM DESCRIPTION:
THE STEWART-TEELE-MITCHELL SOLAR SYSTEM IS INSTALLED IN A 1900 SQ.FT. SINGLE FAMILY DWELLING LOCATED IN MALTA, NY. SOLAR ENERGY IS USED FOR SPACE HEATING AND HOT WATER PREHEATING. THE COLLECTOR ARRAY HEAT TRANSFER FLUID IS 40% GLYCOL/WATER. THE STORAGE AND SOLAR ENERGY DISTRIBUTION FLUID IS WATER. SOLAR ENERGY CAN BE DELIVERED DIRECTLY TO THE LOAD OR TO STORAGE. AUXILIARY SPACE HEATING IS PROVIDED BY AN OIL-FIRED, FORCED AIR FURNACE.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	6.074 MILLION BTU
	14060 BTU/SQ.FT.
COLLECTED SOLAR ENERGY	0.632 MILLION BTU
	1463 BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	21 DEGREES F
AVERAGE BUILDING TEMPERATURE	63 DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.05
ECSS OPERATING ENERGY	0.037 MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.733 MILLION BTU
TOTAL ENERGY CONSUMED	25.175 MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	0.591	16.377	N.A.	16.969 MILLION BTU
SOLAR FRACTION	9	1	N.A.	1 PERCENT
SOLAR ENERGY USED	0.200	0.131	N.A.	0.331 MILLION BTU
OPERATING ENERGY	0.081	0.615	N.A.	0.733 MILLION BTU
AUX. THERMAL ENERGY	0.600	16.247	N.A.	16.847 MILLION BTU
AUX. ELECTRIC FUEL	0.600	N.A.	N.A.	0.600 MILLION BTU
AUX. FOSSIL FUEL	N.A.	23.210	N.A.	23.210 MILLION BTU
ELECTRICAL SAVINGS	-0.018	-0.006	N.A.	-0.062 MILLION BTU
FOSSIL SAVINGS	N.A.	0.218	N.A.	0.218 MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.614

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

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SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY,1979

SOLAR/1018-79/01

SITE/SYSTEM DESCRIPTION:
THE STEWART-TEELE-MITCHELL SOLAR SYSTEM IS INSTALLED IN A 1900 SQ.FT. SINGLE FAMILY DWELLING LOCATED IN MALTA, NY. SOLAR ENERGY IS USED FOR SPACE HEATING AND HOT WATER PREHEATING. THE COLLECTOR ARRAY HEAT TRANSFER FLUID IS 40% GLYCOL/WATER. THE STORAGE AND SOLAR ENERGY DISTRIBUTION FLUID IS WATER. SOLAR ENERGY CAN BE DELIVERED DIRECTLY TO THE LOAD OR TO STORAGE. AUXILIARY SPACE HEATING IS PROVIDED BY AN OIL-FIRED, FORCED AIR FURNACE.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	6.408 GIGA JOULES
	159663 KJ/SQ.M.
COLLECTED SOLAR ENERGY	0.667 GIGA JOULES
	16615 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	-6 DEGREES C
AVERAGE BUILDING TEMPERATURE	17 DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.05
ECSS OPERATING ENERGY	0.039 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.774 GIGA JOULES
TOTAL ENERGY CONSUMED	26.559 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	0.624	17.278	N.A.	17.902 GIGA JOULES
SOLAR FRACTION	9	1	N.A.	1 PERCENT
SOLAR ENERGY USED	0.211	0.138	N.A.	0.349 GIGA JOULES
OPERATING ENERGY	0.085	0.689	N.A.	0.774 GIGA JOULES
AUX. THERMAL ENG	0.633	17.140	N.A.	17.773 GIGA JOULES
AUX. ELECTRIC FUEL	0.633	N.A.	N.A.	0.633 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	24.486	N.A.	24.486 GIGA JOULES
ELECTRICAL SAVINGS	-0.019	-0.006	N.A.	-0.065 GIGA JOULES
FOSSIL SAVINGS	N.A.	0.230	N.A.	0.230 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.614

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SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY, 1979

SOLAR/1018-79/01

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.069	47	0.000	N	0.000	0.000	0.000
2	0.013	38	0.000	C	0.000	0.000	0.000
3	0.698	15	C.C00	T	0.007	0.000	0.000
4	0.409	11	0.007		0.003	0.000	0.016
5	0.695	13	C.144	A	0.007	0.000	0.177
6	0.395	13	C.007	P	0.002	0.001	0.018
7	0.027	20	0.004	P	0.000	0.000	0.162
8	0.007	27	0.011	L	0.000	0.000	1.738
9	0.169	13	0.015	I	0.000	0.000	0.090
10	0.185	8	0.001	C	0.000	0.000	0.004
11	0.319	1	C.012	A	0.000	0.000	0.037
12	0.323	-0	0.009	B	0.000	0.000	0.C29
13	0.033	21	C.002	L	0.000	0.000	0.071
14	0.018	31	C.C12	E	0.000	0.000	0.673
15	0.401	14	0.005		0.004	0.000	0.012
16	0.330	15	C.C14		0.003	0.000	0.041
17	0.048	7	0.012		0.000	0.000	0.246
18	0.070	7	0.001		0.000	0.000	0.009
19	0.486	-2	C.C14		0.000	0.000	0.029
20	0.082	11	0.001		0.000	0.000	0.008
21	0.040	31	C.C10		0.000	0.000	0.261
22	0.130	30	C.CC0		0.000	0.000	0.000
23	0.356	28	0.016		0.006	0.000	0.044
24	0.140	28	C.001		0.002	0.000	0.005
25	0.038	34	0.000		0.000	0.000	0.000
26	0.071	36	C.016		0.000	0.000	0.225
27	0.141	36	C.013		0.002	0.000	0.092
28	0.069	35	0.002		0.000	0.000	0.032
29	0.080	33	C.009		0.000	0.000	0.117
30	0.140	28	0.013		0.001	0.000	0.092
31	0.091	24	0.001		0.000	0.000	0.013
SUM	6.074	-	0.352	N.A.	0.037	0.001	-
AVG	0.196	21	C.011	N.A.	0.001	0.000	0.054
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY,1979

SOLAR/1018-79/01

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.069	0.000	0.000	48	0.000
2	0.013	0.000	0.000	36	0.000
3	0.698	0.573	0.137	14	0.196
4	0.409	0.219	0.047	16	0.116
5	0.695	0.594	0.168	18	0.242
6	0.395	0.144	0.032	*	0.081
7	0.027	0.000	0.000	22	0.000
8	0.007	0.000	0.000	27	0.000
9	0.169	0.000	0.000	19	0.000
10	0.185	0.000	0.000	17	0.000
11	0.319	0.000	0.000	9	0.000
12	0.323	0.000	0.000	6	0.000
13	0.033	0.000	0.000	21	0.000
14	0.018	0.000	0.000	*	0.000
15	0.401	0.231	0.066	18	0.164
16	0.330	0.175	0.043	23	0.131
17	0.048	0.000	0.000	9	0.000
18	0.070	0.000	0.000	10	0.000
19	0.486	0.000	0.000	6	0.000
20	0.082	0.000	0.000	14	0.000
21	0.040	0.000	0.000	34	0.000
22	0.130	0.008	0.001	32	0.010
23	0.356	0.288	0.101	35	0.284
24	0.140	0.089	0.022	29	0.156
25	0.038	0.000	0.000	35	0.000
26	0.071	0.002	0.000	38	0.000
27	0.141	0.050	0.012	40	0.083
28	0.069	0.000	0.000	39	0.000
29	0.080	0.000	0.000	35	0.000
30	0.140	0.023	0.002	30	0.016
31	0.091	0.000	0.000	26	0.000
SUM	6.074	2.397	0.632	-	-
AVG	0.196	0.077	0.020	24	0.104
NBSID	0001		0100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY, 1979

SOLAR/1018-79/01

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.000	0.000	-0.020	84	1.000
2	0.000	0.000	-0.020	82	1.000
3	0.124	0.000	0.091	87	0.738
4	0.033	0.000	-0.013	92	-0.394
5	0.140	0.126	-0.000	93	0.900
6	0.035	0.007	-0.022	90	-0.430
7	0.000	0.004	-0.017	87	1.000
8	0.000	0.011	-0.024	84	1.000
9	0.000	0.015	-0.023	81	1.000
10	0.000	0.001	-0.014	79	1.000
11	0.000	0.012	-0.017	77	1.000
12	0.000	0.009	-0.015	75	1.000
13	0.000	0.002	-0.006	73	1.000
14	0.000	0.012	-0.015	72	1.000
15	0.061	0.004	0.047	73	0.825
16	0.050	0.014	0.024	78	0.764
17	0.000	0.012	-0.020	79	1.000
18	0.000	0.001	-0.010	77	1.000
19	0.000	0.014	-0.017	75	1.000
20	0.000	0.001	-0.007	73	1.000
21	0.000	0.010	-0.016	72	1.000
22	0.001	0.000	-0.007	70	-6.093
23	0.105	0.016	0.072	74	0.843
24	0.020	0.001	0.005	80	0.282
25	0.000	0.000	-0.010	80	1.000
26	0.000	0.016	-0.019	77	1.000
27	0.007	0.013	-0.017	76	-0.606
28	0.000	0.002	-0.006	74	1.000
29	0.000	0.009	-0.011	72	1.000
30	0.003	0.013	-0.011	71	0.435
31	0.000	0.001	-0.005	70	1.000
SUM	0.578	0.326	-0.126	-	-
AVG	0.019	0.011	-0.004	78	0.346
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

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SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: STEWART-TEFLE-MITCHELL
REPORT PERIOD: JANUARY, 1979

SOLAR/1018-79/01

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USED GAL
1	0.012	0	0.000	0.000	0.017	0.017	N	0.000	N	52	118	20
2	0.034	0	0.000	0.000	0.035	0.035	O	0.000	O	50	118	56
3	0.006	0	0.000	0.000	0.012	0.012	T	0.000	T	60	117	9
4	0.036	0	0.000	0.000	0.037	0.037		0.000		59	116	58
5	0.003	0	0.000	0.000	0.011	0.011	A	0.000	A	54	119	6
6	0.035	2	0.007	0.001	0.031	0.031	P	0.001	P	58	120	57
7	0.010	7	0.004	0.003	0.015	0.015	P	-0.002	P	53	119	10
8	0.015	6	0.011	0.004	0.013	0.013	L	-0.002	L	53	115	26
9	0.031	15	0.015	0.006	0.020	0.020	I	0.000	I	54	116	50
10	0.002	16	0.001	0.002	0.009	0.009	C	-0.002	C	59	117	4
11	0.025	15	0.012	0.004	0.024	0.024	A	0.000	A	56	116	39
12	0.025	9	0.009	0.004	0.021	0.021	B	-0.003	B	56	117	41
13	0.002	8	0.002	0.004	0.010	0.010	L	-0.004	L	54	117	4
14	0.034	11	0.012	0.003	0.027	0.027	E	0.003	E	58	117	55
15	0.011	20	0.004	0.003	0.015	0.015		-0.000		57	118	18
16	0.021	11	0.014	0.004	0.020	0.020		-0.003		57	116	35
17	0.025	10	0.012	0.006	0.020	0.020		-0.004		60	120	39
18	0.015	7	0.001	0.001	0.015	0.015		-0.001		54	118	24
19	0.027	15	0.014	0.004	0.024	0.024		0.002		54	117	44
20	0.021	9	0.001	0.002	0.018	0.018		-0.002		44	119	33
21	0.016	12	0.010	0.002	0.018	0.018		0.002		56	117	26
22	0.003	10	0.000	0.000	0.008	0.008		0.000		59	118	5
23	0.027	12	0.016	0.004	0.025	0.025		-0.002		53	121	44
24	0.009	6	0.001	0.001	0.011	0.011		-0.001		63	117	14
25	0.008	4	0.000	0.000	0.011	0.011		0.000		61	117	13
26	0.025	16	0.016	0.004	0.024	0.024		0.003		49	117	41
27	0.038	10	0.013	0.002	0.031	0.031		0.001		47	119	59
28	0.016	11	0.002	0.003	0.015	0.015		-0.001		51	118	25
29	0.017	11	0.009	0.003	0.019	0.019		-0.001		53	117	27
30	0.033	13	0.013	0.006	0.027	0.027		0.000		57	120	53
31	0.009	13	0.001	0.002	0.013	0.013		-0.002		57	116	15
SUM	0.591	-	0.200	0.081	0.600	0.600	N.A.	-0.018	N.A.	-	-	950
AVG	0.019	9	0.006	0.003	0.019	0.019	N.A.	-0.001	N.A.	55	118	31
NBS	Q302	N300	Q300	Q303	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

4241

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY, 1979

SOLAR/1018-79/01

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	CPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.224	0	0.000	0.009	0.224		0.320	-0.000	0.000	65	47
2	0.263	0	0.000	0.010	0.263		0.376	0.000	0.000	64	38
3	0.652	0	0.000	0.023	0.652		0.931	0.000	0.000	64	15
4	0.917	1	0.007	0.032	0.911		1.301	-0.001	0.011	63	11
5	0.606	20	0.123	0.028	0.483		0.690	-0.003	0.205	63	13
6	0.500	0	0.000	0.017	0.500		0.714	-0.000	0.000	61	13
7	0.612	0	0.000	0.024	0.612		0.874	0.000	0.000	63	20
8	0.392	0	0.000	0.015	0.392		0.560	0.000	0.000	63	27
9	0.355	0	0.000	0.012	0.355		0.507	0.000	0.000	62	13
10	0.721	0	0.000	0.026	0.721		1.031	0.000	0.000	63	8
11	0.781	0	0.000	0.029	0.781		1.116	0.000	0.000	63	1
12	0.826	0	0.000	0.031	0.826		1.180	0.000	0.000	64	-0
13	0.705	0	0.000	0.027	0.705		1.007	0.000	0.000	62	21
14	0.350	0	0.000	0.014	0.350		0.500	0.000	0.000	64	31
15	0.661	0	0.001	0.026	0.661		0.944	-0.001	0.001	63	14
16	0.622	0	0.000	0.024	0.622		0.889	-0.000	0.000	64	15
17	0.705	0	0.000	0.025	0.705		1.007	0.000	0.000	60	7
18	0.731	0	0.000	0.028	0.731		1.044	0.000	0.000	63	7
19	0.801	0	0.000	0.028	0.801		1.144	0.000	0.000	60	-2
20	0.622	0	0.000	0.022	0.622		0.888	0.000	0.000	61	11
21	0.413	0	0.000	0.014	0.413		0.590	0.000	0.000	60	31
22	0.493	0	0.000	0.018	0.493		0.704	-0.000	0.000	63	30
23	0.274	0	0.000	0.010	0.274		0.392	-0.000	0.000	63	28
24	0.510	0	0.000	0.020	0.510		0.729	0.000	0.000	64	28
25	0.399	0	0.000	0.016	0.399		0.570	0.000	0.000	67	34
26	0.364	0	0.000	0.014	0.364		0.519	0.000	0.000	65	36
27	0.266	0	0.000	0.012	0.265		0.379	-0.001	0.000	66	36
28	0.278	0	0.000	0.011	0.278		0.398	0.000	0.000	64	35
29	0.402	0	0.000	0.015	0.402		0.574	0.000	0.000	64	33
30	0.391	0	0.000	0.014	0.391		0.558	0.000	0.000	64	28
31	0.541	0	0.000	0.020	0.541		0.773	0.000	0.000	63	24
SUM	16.377	-	0.131	0.615	16.247	N.A.	23.210	-0.006	0.218	-	-
AVG	0.528	1	0.004	0.020	0.524	N.A.	0.749	-0.000	0.007	63	21
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

ACTAPPLICABLE

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SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: STEWART-TEELE-MITCHELL
REPORT PERIOD: JANUARY, 1979

SOLAR/1018-79/01

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	159	N	47	48	N	N	N
2	31	O	38	36	O	O	O
3	1616	T	15	14	T	T	T
4	947		11	16			
5	1608	A	13	18	A	A	A
6	915	P	13	*	P	P	P
7	62	P	20	22	P	P	P
8	15	L	27	27	L	L	L
9	392	I	13	19	I	I	I
10	427	C	8	17	C	C	C
11	739	A	1	9	A	A	A
12	747	B	-0	6	B	B	B
13	77	L	21	21	L	L	L
14	42	E	31	*	E	E	E
15	928		14	18			
16	765		15	23			
17	110		7	9			
18	163		7	10			
19	1125		-2	6			
20	191		11	14			
21	92		31	34			
22	300		30	32			
23	825		28	35			
24	325		28	29			
25	88		34	35			
26	165		36	38			
27	326		36	40			
28	159		35	39			
29	185		33	35			
30	324		28	30			
31	212		24	26			
SUM	14060	N.A.	-	-	-	-	-
AVG	454	N.A.	21	24	N.A.	N.A.	N.A.
NBS ID	Q001		N113			N115	N114

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